The CDC Guide to Strategies for Reducing the Consumption of Sugar-Sweetened Beverages

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Using This Guide

This document provides guidance for program managers, policy makers, and others seeking to identify strategies to reduce sugar-sweetened beverage (SSB) consumption. Several strategies are outlined in this Guide, each of which includes;

Strategy: An environmental change or policy-related activity intended to prevent disease or promote health in a group of people, also referred to in the literature as "intervention." Criteria for inclusion of a strategy in the document are a rationale supporting the strategy, and evidence that the strategy has been effective.

Definition: Briefly describes the strategy.

Rationale: Explains why the particular strategy is important to reduce consumption of SSBs.

Evidence of effectiveness: Draws on peer-reviewed literature and current practice to summarize support for the strategy as well as indicators of successful implementation.

Key considerations: Information that may be important to keep in mind during the planning, implementation, and/or evaluation phases of a recommended strategy.

Potential action steps: Identifies specific activities for each strategy for the priority settings for obesity prevention (communities, schools, worksites, and medical care settings).

Program examples: Examples of programs that employ the recommended strategies as a means of decreasing consumption of SSBs are presented. Program examples were selected from interventions described in publications, such as peer-reviewed journals or programmatic reports, identified through key informants and through internet searches..

[*]**Resources:** Guides the reader to further materials and information that might be useful in implementing the recommended strategies.

References: A sequential list of all information sources.

[*]Note: Web site addresses of nonfederal organizations are provided solely as a service to readers. Provision of an address does not constitute an endorsement of this organization by CDC or the federal government. CDC is not responsible for the content of the individual organization Web pages.

I. Background

Sugar-sweetened beverages (SSBs) are the largest source of added sugar[1] and an important contributor of calories in the U.S. diet.[2] SSBs also tend to have few, if any, other nutrients. While the definitions used by researchers have varied,[3-5] we define SSBs to include soft drinks (soda or pop), fruit drinks, sports drinks, tea and coffee drinks, energy drinks, sweetened milk or milk alternatives, and any other beverages to which sugar, typically high fructose corn syrup or sucrose (table sugar), has been added (See Sugar Sweetened Beverages on this page). Although the presence of protein and other nutrients differentiates sweetened milk and alternative milk beverages from other SSBs, adding sugar to plain milk can substantially increase the calories per serving without increasing the overall nutrient value of the drink.

Sugar-Sweetened Beverages

Sugar-sweetened beverages are those that contain caloric sweeteners and include:
Soft drinks: Nonalcoholic, flavored, carbonated or non-carbonated beverages usually commercially prepared and sold in bottles or cans
Soda, pop, soda pop: Same as soft drink
Fruit drinks, punches, or ades: Sweetened beverages of diluted fruit juice
Sports drinks: Beverages designed to help athletes rehydrate, as well as replenish electrolytes, sugar, and other nutrients
Tea and coffee drinks: Teas and coffees to which caloric sweeteners have been added
Energy drinks: Most energy drinks are carbonated drinks that contain large amounts of caffeine, sugar and other ingredients, such as vitamins, amino acids, and herbal stimulants
Sweetened milks or milk alternatives: Beverages prepared by blending sweetened powder or syrup and milk*

**Though the body's response to added sugar in milk may differ from that of other SSBs because of the presence of protein and other nutrients, adding sugar to milk substantially increases the calories per serving.*

In 1965, per capita consumption of SSBs (excluding sweetened milks) was 50 kcal/day (2.5% of total calories) among adults in the United States.[6] Currently, consumption is estimated at 224 kcal/day (11% of total calories) among youth[5] and 203 kcal/day (9% of total calories) among adults.[3] On a typical day, 80% of youth[5] and 63% of adults consume SSBs.[3]

The highest consumers of SSBs are adolescents aged 12 to 19 years (13% total calories), particularly males, non-Hispanic blacks and Mexican-Americans, those who are low-income, or obese (14% to 16% total calories).[5]

Several social and environmental factors have been linked to the purchase and consumption of SSBs. These factors include advertising and promotion;[7] increased portion sizes;[8] fast food consumption;[9] television watching;[10] permissive parenting practices;[11] parental SSB consumption;[12] and increased access to SSBs in the home and school.[5,13,14]

Several mechanisms have been proposed to explain the association between SSB consumption and obesity. First, individuals may fail to compensate for the added calories consumed as liquid and may result in excess intakes of sugar and calories.[15] Second, the rapid drop in blood sugar that follows the insulin response to consumption of foods high in sugar increases hunger and may thereby increase food consumption.[16] The third possible mechanism is the inability of fructose (a sugar found in commonly used sweeteners) to stimulate hormones that help regulate satiety.[17] Fourth, the inborn human desire for the sweet taste can override normal satiety

signals.[14]

High consumption of SSBs has been associated with obesity. Many longitudinal studies, but not all, have shown an association between SSBs and various measures of increased body fat.[18-26] Systematic reviews indicate that a greater consumption of SSBs is associated with small but significant weight gain and obesity.[15,27] In addition, the results of the recent PREMIER trial demonstrated that in reduction of SSB consumption among adults was significantly associated with weight loss. A decrease of 1 serving/day (12 ounces) was associated with a minor weight loss of 0.49 kg at 6 months and 0.65 kg at 18 months among adults.[28]

Several other health conditions have been associated with the consumption of SSBs. These include diabetes,[29,30] elevated triglycerides,[31,32] cardiovascular disease,[33] non-alcoholic fatty liver disease,[34] elevated uric acid levels,[35] gout,[36] and dental caries.[37] Furthermore, SSB consumption has been linked to nutritionally inadequate diets, possibly due to displacement of nutrient-rich foods, such as milk, with SSBs.[38-41]

II. Strategies for Reducing Sugar-Sweetened Beverage Consumption

Research indicates that consumption of SSBs is a modifiable behavior and that reducing consumption can result in a decrease in weight,[28] a measure commonly used to assess excess body fat. Strategies to reduce SSB consumption have been identified for each of the priority settings for obesity prevention. These include communities (including homes), schools (including child care facilities), worksites, and medical care settings. The selection of each of these intervention strategies is based on a rationale supporting the strategy. The evidence review included (1) an extensive search and review of the published literature identified through multiple searches of PubMed and (2) an extensive search and review of program reports identified through multiple internet searches and key informants.

Presented below are the strategies for reducing SSB consumption. Strategies that apply to all of the priority settings are listed first, followed by strategies that are setting-specific.
For each strategy, the following are provided:

A. Definition
B. Rationale for the strategy
C. Summary of the available evidence of the strategy's effectiveness
D. Key considerations, such as barriers to implementation
E. Potential action steps
F. Program examples
G. Existing resources and tools for implementation

Strategies Applicable in All Priority Settings

Strategy 1: Ensure ready access to potable drinking water

A. Definition

To promote water consumption, potable drinking water should be easily accessible to children and adults in homes and public facilities, including parks, playgrounds, schools, public buildings, worksites, and clinics.

B. Rationale

Water is essential for life. Although our daily fluid intake requirements can be obtained from a variety of beverages and foods, potable drinking water is a calorie-free, thirst-quenching option.[42] In addition, fluoridated drinking water has another key function: it helps to prevent dental caries, the most prevalent chronic disease among children in the United States.[43]

In 2008, 8% of the U.S. population served by community water systems received drinking water that did not meet all applicable health-based drinking water standards.[44] Furthermore, in communities with potable drinking water, ready access outside of the home in schools, parks, public and commercial buildings is often limited because water fountains or coolers are not functioning.

Individuals without ready access to potable drinking water may consume more SSBs. For example, many rural areas in Alaska (northern and southwestern regions) lack ready access to potable drinking water. In these areas, over half (58%) of 2-year-olds drank two or more cups of SSBs (>13 teaspoons of added sugar) per day compared to 21%–26% of 2-year olds in all other regions of the state in 2006.[45] Rural Alaskan adults drink about three times as much soda per day as their urban counterparts.[46]

Over the past decade, bottled water sales have increased dramatically in the United States.[47] This increase has been influenced by the marketing and availability of a vast selection of new bottled water products and by consumer demand. The Institute of Medicine (IOM) Committee on Nutrition Standards for Foods in Schools examined evidence on increased consumption of bottled water products and their effects. The IOM recommended that carbonated, fortified, and flavored water should be excluded during the school day. This exclusion was based on evidence that these beverages are unnecessary for hydration and are associated with displacement of beverages that are more healthful than SSBs. In addition, the increasing number of products makes it difficult to identify the more healthful products among them.[48]

C. Evidence of Effectiveness

Three school-based interventions have been effectively increased water consumption among school-aged children.

A school-based environmental and educational intervention was conducted to promote water consumption among elementary school students in Germany. The intervention focused on the water needs of the body and the water circuit in nature. For the environmental intervention, water fountains were installed in schools, and plastic water bottles were given to each child. Outcome measures were evaluated at baseline and 1 year after intervention. The results indicated that the risk of overweight was significantly decreased by 31% in the intervention group compared to the control group. Furthermore, water consumption was 1.1 glasses/day (about 7.4 ounces) higher in the intervention group.[49]

A randomized, controlled trial was conducted to determine whether a multicomponent intervention aimed at discouraging SSB consumption could prevent excessive weight gain among 22 elementary schools in Brazil. Fourth graders in the intervention schools were given classroom-based education encouraging water consumption instead of SSBs throughout the school year. All students in the intervention classes were taught the benefits and importance of drinking water. In addition, a campaign promoting water consumption was conducted and water bottles with the campaign logo were distributed to the children and their teachers. After 7 months, children in the intervention schools drank significantly less carbonated beverages, about 2 ounces over the previous 24-hour recall, than those in the control schools. In addition, among overweight students at baseline, the intervention group had greater body mass index (BMI) reduction than the control group, but this difference was statistically significant among girls only. However, water intake was not measured.[50]

The Zuni High School Diabetes Prevention Program was a multicomponent intervention and conducted among American Indian high school students in the United States. Health education was provided to decrease SSB consumption and to increase knowledge of diabetes risk factors. Furthermore, this education was combined with environmental change to increase access to potable drinking water and physical activity. Outcome measures were evaluated at 0, 1.5, and 3 years. The results indicated that reducing access to SSBs could eliminate in-school SSB consumption among high school students. By the intervention's third year, the 400 students of Zuni High School consumed almost no sugared soft drinks at school, a decrease from 800 12-ounce cans/week/400 students (24 ounces/week/student). Soft drinks had been replaced by 150 gallons of water per week from the water coolers (24 ounces/week/student) and 260 12-ounce cans of diet soda (7.8 ounces/week/student). However, there were no significant differences in BMI over a 3 year-period.[51]

D. Key Considerations

- Increased bottled water sales have raised concerns regarding the lack of regulation, the lack of fluoridation, and the impact on the environment related to bottling and disposal practices.
- Because the taste and odor of drinking water is not included in federal and state requirements, challenges (e.g., costs) in providing palatable drinking water should be addressed.[52]

E. Potential Action Steps

All settings

- Complete a needs assessment to identify where access to potable drinking water is limited.
- Collaborate with oral health partners and others with a common interest to develop a workplan to promote the consumption of (fluoridated) drinking water.
- Advocate with public and private partners to improve the infrastructure to increase access to potable drinking water.
- Collaborate with state, local, and city government officials to establish, promote, and enforce policies to ensure ready access to potable drinking water.

Schools and child care facilities

- Promote legislation in your state to establish and promote policies to ensure children attending schools and child care facilities have ready access to potable drinking water throughout the day, including at meals.

F. Program Examples

School-based

Zuni High School Diabetes Prevention Program

A school-based multicomponent intervention was conducted to reduce SSB consumption as part of the Zuni Pueblo High School Diabetes Prevention Program. The intervention for American Indians included health education targeting decreased SSB consumption and increased knowledge regarding diabetes risk. The environmental change component included providing quality water for students in coolers in several school locations. Additionally, school officials gradually replaced sugar-sweetened soft drinks in the vending machines with diet soft drinks. Within 2 years, sugar-sweetened soft drinks in the schools were completely replaced by water and diet soft drinks.[51]

"Fresh Kids" Primary School Intervention

The aim of the Fresh Kids program was to evaluate the effectiveness of the Health Promoting Schools (HPS) framework. The framework was used to create a supportive school environment to increase water and fruit consumption and prevent obesity among students in 35 primary schools in Australia. The HPS objectives included: (1) establishing sustainable program partnerships between schools and local health and community agencies; (2) creating supportive school environments which promote water and fruit consumption during school day; and (3) enhancing student learning by linking the school curriculum with broader strategies to promote water and fruit consumption. Lunchbox audits were conducted to evaluate change in student dietary patterns. By the end of the first year, the increase in the proportion of children with filled water bottles ranged from 25% to 50% in these schools. The proportion of SSBs in lunchboxes decreased in all schools, by 11% to 38%.[53]

New York City's Nutritional Standards for Child Care

New York City Code requires that potable drinking water be made easily accessible to children attending child care throughout the day, including at meals. City code also prohibits providing beverages with added sweeteners, whether artificial or natural, to children enrolled in child care.[54]

G. Resources

All Settings

- **Wise up on Water**: Water UK. This document highlights the importance of adequate water intake for children. http://www.water.org.uk/home/water-for-health/resources/wise-up---children-web.pdf
- **Bottled Water, Learning the Facts and Taking Action**: Sierra Club. This document provides facts about bottled water and advocating for a reduction of bottled water use and an increased use of tap water. http://www.sierraclub.org/committees/cac/water/bottled_water/bottled_water.pdf
- **Fact Sheet on Questions About Bottled Water and Fluoride**: Centers for Disease Control and Prevention, Division of Oral Health, This fact sheet covers common questions about bottled water and fluoride. http://www.cdc.gov/fluoridation/fact_sheets/bottled_water.htm

Schools

- **Water Quality Funding Sources for Schools**: Environmental Protection Agency. This guide provides a list of over 60 national and state funding sources that schools may use to address water quality and other environmental health issues. http://www.epa.gov/-OGWDW/schools/pdfs/lead/funding_schools_fundingsources.pdf

Strategy 2: Limit access to sugar-sweetened beverages

A. Definition

SSBs are readily accessible in homes, schools, worksites, and communities. Limiting availability and accessibility of SSBs can decrease SSB consumption and increase the consumption of more healthful beverages.

B. Rationale

Currently, SSBs are readily accessible to children and adults throughout the day in their homes, schools, and worksites. Even very young children are being given SSBs by their parents and caregivers in home and child care settings. Almost 30% of 12- to 14-month-old children, 37% of 15- to 18-month-old children, and 44% of 19- to 24-month-old children consume fruit drinks and/or carbonated soft drinks at least once in a day.[55] On weekdays, children obtain 55% to 70% of the SSB calories they consume at home whereas, only 7% to 15% are consumed in schools.[5] Among young adults (age 20 to 44 years) about 50% of SSBs are consumed at home, and 20% are consumed at work.[3]

Several factors in the community and home environment influence beverage consumption patterns including accessibility of SSBs and parenting practices, although the impact of these influences may vary by sex. For example, adolescent boys with greater access to less healthful beverages at home are more likely to consume SSBs. However this access appears to be a poor predictor of soft drink consumption in girls.[11] Parenting behavior is also important; adolescent soda consumption has been associated with parental soda consumption.[56] The availability of fast food restaurants in communities may also play a role, as frequent use of fast food restaurants was associated with higher SSB consumption.[9]

School-aged children gain access to SSBs at school throughout the day through vending machines, school canteens, and at fundraising activities, school parties, and sporting events.[57] In the United States, 21% of elementary schools, 62% of middle schools, and 86% of high schools have a vending machine, a school store, a canteen, or a snack bar where students can purchase foods or beverages, often during their lunch periods.[57] While national school meal programs require that meals meet national nutrition standards, competitive foods (foods which are sold outside the United States Department of Agriculture (USDA) school meals programs) are not required to meet these standards.

Many schools have "pouring contracts" with their beverage suppliers, and profits from these contracts provide income to the school in proportion to beverage sales. Thus, encouragement to consume SSBs via school-based advertising and opportunities such as increased access to scholarship funds (from beverage suppliers) are greater in schools that have beverage contracts.[58,59] While concerns have been raised regarding the potential loss of income that would result from revising or eliminating pouring contracts, evidence suggests that these concerns may be unfounded. A review of school beverage contracts in Oregon Public School Districts in 2004 showed that vendor cash advances and non-cash payments to the school are minimal, ranging

between $2 and $8 per student per year. This is in contrast to an expected vendor profit of $12 to $24 per student per year.[58]

Many state agencies and school districts impose restrictions on the sale of beverages and foods sold in schools. Twenty-three states (46%) and many school districts have policies for competitive foods that are more stringent than USDA regulations on the National School Lunch Program.[60] Another study reported that 19 (39%) of the 51 largest school districts in each state and the District of Columbia had competitive food policies beyond state or federal requirements in 2004–2005. Of those 19 school districts, 63% had policies that restrict soda in all schools, and 74% had policies that restrict sugar content of juice drinks.[61] Coinciding with this study, a recent report was released to assess availability of less healthful beverages and snack foods in middle and high schools as a part of the 2008 School Health Profiles Survey. The percentage of schools that restrict soda pop or sports drink sales to students varied widely. Among the 34 states included in this study, the 2008 data showed that the percentage of schools in which students could not purchase soda pop or sports drinks in schools ranged 26%–93% for soda pop and 23%–85% for sports drinks. Furthermore, the state median percentage of schools that restrict soda pop or sports drink sales to students was 63% for soda pop and 44% for sports drinks.[62]

A large proportion of children in the United States are enrolled in some form of child care facility. Based on the 2005 National Household Education Survey, 51% of U.S. children ages 0–2 years and 74% of children ages 3–6 years who were not in kindergarten were in some form of non-parental care. About 20% of children ages 0–2 years and 57% of children ages 3–6 years who were not in kindergarten were in center-based child care facilities.[63] However, a review of U.S. state regulations for child care facilities for all 50 states and the District of Columbia reported that only seven states (14%) have regulations which restrict SSBs in both child care centers and family child care homes. Furthermore, only four states (8%) have regulations which prohibit vending machines at the child care center, and two of these states also restrict vending machines at family child care homes.[64]

Vending machines were available in 79% (15 out of 19) of health care facilities (8 hospitals, 7 clinics, and 4 public health departments) located in six California communities that are participating an environmentally focused childhood obesity prevention program. The majority of beverages sold in vending machines were less healthy items. The most prevalent beverage was soda: 30% in hospital vending machines and 38% in clinic vending machines. Water (20%) comprised the highest percentage of all beverages offered for sale in health department vending machines. Across 19 health care facilities, 75% of beverages offered for sale in vending machines did not follow the California school nutrition standards.[65]

C. Evidence of Effectiveness

Students who participate in the National School Lunch Program, which restricts the sale of carbonated soft drinks in the same location where lunch is being served, consume significantly less added sugar than nonparticipants. Among participants, mean intake of added sugars contributed 17% of their daily caloric intakes, compared with 20% for nonparticipants.[66]

The Alliance for a Healthier Generation, a collaboration between the Clinton Foundation and the

American Heart Association, developed School Beverage Guidelines[67] to promote the consumption of lower-calorie and nutritious beverages outside of school meals among students during the regular and extended school day. In voluntary agreement with the Alliance, the American Beverage Association and several beverage producers have adopted these guidelines as their school beverage policy. In doing so, the American Beverage Association and several beverage producers agreed to encourage their bottlers to adhere the School Beverage Guidelines. They also agreed to support an annual analysis to assess the implementation and impact of these guidelines. According to the 2007 independent evaluation of the program, nearly 80% of all school beverage contracts were in compliance with these guidelines, contributing to an almost 60% drop in beverage calories shipped to schools since 2004.[68] Furthermore, the reduction in the purchase of regular carbonated soft drinks was observed among high school students after the implementation of these guidelines. The average student purchased 12.5 ounces of regular carbonated soft drinks per week in schools (about one can of soda per school week) in 2004, but by the 2007–2008 school year, these soft drink purchases decreased by one-third to two-thirds of a can per student per week.[68]

D. Key Considerations

All settings

- Once policies are adopted, ensure that enforcement mechanisms are in place for these policies including those voluntarily adopted by the beverage industry.

Schools

- While schools provide an important opportunity to restrict SSB availability, educate, and model healthy behavior, reducing SSB consumption only at school may have little impact on overall SSB consumption, because the majority of SSBs are consumed at home.[5]
  Schools may be resistant to changes in their beverage policies until concerns regarding potential loss of revenue from the sale of SSBs are addressed. A growing body of evidence indicates that schools can have strong nutrition standards that restrict availability of SSB and maintain financial stability.

E. Potential Action Steps

All settings

- Use price adjustments to decrease the cost of more healthful beverage alternatives in relation to SSBs (See Potential Action Steps for Strategy 5).
- Establish a policy to require providing a greater proportion of healthier beverages relative to SSBs.

Schools

- Convene a meeting with school officials to jointly address the availability and sale of SSBs in schools and suggest they involve students in these discussions.
- Collaborate with state and school district officials to include in school wellness and nutrition policies a component that eliminates the sale of SSBs on school grounds, including sports venues, and as part of school-based activities such as fundraising efforts consistent with

recommendations from IOM Nutrition Standards for Foods in Schools, Leading the Way Toward Healthier Youth.[48]

- Collaborate with state and school district officials to redefine or eliminate beverage "pouring contracts" in schools. As needed, build support for pouring contract changes by addressing concerns of school administrators, parents, and others regarding potential loss of revenue.

F. Program Examples

Community-based

City of New York

The city of New York is the first major city to set nutrition standards for all foods purchased and served. These guidelines apply to all meals or food supplies that are purchased, prepared or served in agency programs or other relevant settings. These standards are part of the city's effort to reduce obesity in school children who are the most frequent consumers of city food, and to reduce obesity and high blood pressure in adults and seniors who regularly consume publicly-purchased food. The new standards apply to snacks and meals served in places such as schools, senior centers, homeless shelters, child care centers, after school programs, correctional facilities, public hospitals, and parks. The standards require city agencies to serve only more healthful beverages such as skim or 1% milk (children aged 12 months to less than 2 years are allowed to drink whole milk).

These standards require ≤25 calories per 8 ounces for beverages other than 100% juice or milk. Juice must be 100% fruit juice, and serving size is recommended not to exceed 6 ounces per serving for children in elementary school. For children ages 2–18 years flavored milk and flavored fluid milk substitutes are permitted but required to be ≤130 calories per serving. These standards include a recommendation that agencies continue to phase out flavored milk and flavored fluid milk substitutes over time.[69]

School-based

National School Lunch and School Breakfast Programs

The National School Lunch Program (NSLP) and the School Breakfast Program are federally supported programs that provide nutritionally balanced meals at low-cost or no-cost to students in nearly all public and many private schools throughout the United States. USDA regulations prohibit the sale of Foods of Minimal Nutritional Value, including carbonated soft drinks, at the same time and in the same location that national food program meals are being served. Evidence suggests that NSLP participants are 4 times as likely as nonparticipants to consume milk at lunch and to have adequate daily intakes of key nutrients.[70]

West Virginia Department of Education Standards for School Nutrition

Legislative rules were passed by the West Virginia State Department of Education in 2008 to establish comprehensive nutrition standards for beverages and foods sold, served or distributed during the school day. The rules specify that beverages available to students at all grade levels must contribute to students' nutrient requirements and should not add unnecessary calories, fat, or sodium. Specifically, allowable beverages are water, 100% fruit and/or vegetable juice, and

non-fat or 1% low-fat milk (flavored or unflavored). All beverages must contain less than 200 calories and less than 35% of calories from sugar. Portion sizes of juice should be limited to 4 ounces for elementary students and no more than 8 ounces for middle and high schools students. Drinking water must be offered with meals. Furthermore, plain, unflavored drinking water must be available to students throughout the school day at no charge. Unacceptable beverages by these rules are soft drinks, coffee and coffee-based products, and other caffeinated products. In addition, the Board of Education policy also prohibits the use of beverages as a means of reward, restricts the use of beverages in fundraising, and sets limits on school advertising of beverages.[71]

The new policy is being phased in throughout West Virginia. Internal reports prepared by the West Virginia Department of Education indicate that the number of schools in compliance with these rules increased from 25 schools in 2007–08 to 46 schools in 2009–09. The impact of this new policy on school revenues has been minimal.[72]

Philadelphia School District Beverage Policy

A new beverage policy for the School District of Philadelphia, the fifth largest school district in the country, was developed to promote healthy eating and decrease childhood obesity and diet-related diseases. The new beverage policy eliminated sodas and implemented a policy for all vending and à la carte sales as of July 2004. Allowable beverages are 100% juice, water, with no additives except those normally added to tap water, and low-fat or non-fat milk (plain or flavored).[73]

G. Resources

Schools

- **IOM Nutrition Standards for Foods in Schools: Leading the Way to a Healthier Youth (2007)**: Funded by the Centers for Disease Control and Prevention and developed by the Institute of Medicine, this report sets nutrition standards for K-12 schools focused on competitive foods. http://www.iom.edu/CMS/3788/30181/42502.aspx
- **Nutrition Standards for Foods in Schools Fact Sheets** provide information for students, school staff, and parents to use to support strong nutrition standards consistent with the Institute of Medicine's recommendations. http://www.cdc.gov/Healthyyouth/nutrition/standards.htm
- **Making it Happen! School Nutrition Success Stories**: U.S. Department of Agriculture and the Department of Health and Human Services' Centers for Disease Control and Prevention. This is a collection of approaches implemented by over 30 schools and school districts to improve the nutrition environment in schools. http://www.fns.usda.gov/tn/Resources/makingithappen.html
- **State Laws & Regulations Governing Beverage Sales in Schools**: The American Beverage Association & the Alliance for a Healthier Generation. It is a comprehensive list of state school beverage legislation. The list provides information on states with federal regulations only or state and federal regulations. The following is a direct link to this document: http://www.schoolbeverages.com/research--faqs/school-wellness-policies/download.aspx?id=59. The following is a link to the entire website: http://www.schoolbeverages.org/index.aspx

- **Action for Healthy Kids: Wellness Policy Toolkit**: Action for Healthy Kids. This toolkit provides a comprehensive step by step guide to developing a Local Wellness Policy within your school district. The toolkit also offers policy implementation strategies. http://www.actionforhealthykids.org/wellnesstool/index.php
- **Healthy Beverage Toolkit**: Food Trust. The toolkit provides school staff and administration, parents and the community with information about promoting healthy beverage consumption in schools to address childhood obesity. The toolkit highlights the importance of advocating for policies, engaging key partners, coalition building and other relevant topics. http://www.thefoodtrust.org/php/programs/school.food.beverage.reform.php
- **Best Practices for Healthy Eating: A Guide to Help Children Grow Up Healthy**: Nemours. This nutrition guide was prepared in collaboration with Delaware's Child and Adult Care Food Program as a guide for parents and health professionals on recommended eating habits throughout the life stages of infancy through adolescence. The guide is sectioned by age and food groups making it easy to find information. http://www.nemours.org/department/nhps/child-care/healthy-habit.html
- **School Beverage Guidelines Toolkit**: Alliance for a Healthier Generation. This toolkit provides guidelines for schools to assist them in revising their beverage policies in order to promote the consumption of more healthful beverage options among students. http://www.healthiergeneration.org/uploadedFiles/For_Schools/Helpful_Tools/Alliance%20School%20Beverage%20Toolkit.pdf

Strategy 3: Promote access to and consumption of more healthful alternatives to sugar-sweetened beverages

A. Definition

Beverages such as water, low-fat/non-fat milk, and 100% juice contribute to meeting daily nutrient needs. Although SSBs contain water, they tend to be high in calories and have few other nutrients, thus, may negatively impact dietary quality and contribute to excess energy intake.[3,20] This strategy aims to increase efforts by policymakers, community leaders and parents to provide access to and encourage consumption of more healthful beverages in place of SSBs. Efforts to promote the consumption of more healthful alternatives to SSBs include developing or adopting healthy beverage policies for various settings. These alternative beverages, in addition to calories, often provide valuable nutrients including calcium, iron, folate, and vitamins A and C, etc.[74,75]

While there is no standard definition of a healthy beverage, the IOM School Nutrition Beverage Guidelines have established recommendations for school-age children. The IOM School Nutrition Beverage Guidelines are shown on this page.[48]

B. Rationale

Providing access to more healthful alternatives to SSBs may be important for reducing SSB consumption, because individuals without ready access to potable drinking water tended to drink more SSBs.[45] Furthermore, when availability of healthier beverages (e.g., milk) increased, their consumption increased and SSB consumption decreased.[76]

Marketing of foods and beverages influences children's preferences, purchase requests, and consumption.[77] In addition, beverage consumption patterns of parents appear to be an important influence on their children's consumption of soft drinks.[12] Youth whose parents regularly drink soft drinks are nearly three times more likely to consume soft drinks five or more times per week.[14] When parents avoid consuming soft drinks in the presence of children, children consume fewer soft drinks.[12]

C. Evidence of Effectiveness

Institute of Medicine (IOM) School Nutrition Beverage Guidelines

The IOM School Nutrition Committee developed recommendations for beverages sold outside of the national school meal programs.[48] Tier 1 beverages are those that provide important health benefits and do not exceed levels of nutrients and compounds that may be unhealthful for school-age children when consumed in excess. These include:

- Plain, potable water
- Low-fat/non-fat milk (or soy/lactose-free alternatives) in 8-ounce portions and, if flavored, with less than 22 g of total sugars per 8-ounce portion
- 100% fruit juice in 4-ounce portion for elementary and middle school and 8 ounces for high schools

Tier 2 beverages are for high school students and after school only. These provide additional options that help to limit caloric intake. These include:

- Non-caffeinated, non-fortified drinks that contain <5 calories per portion as packaged (with or without nonnutritive sweeteners, carbonation, or flavoring)

Other beverages:

- Sports drinks should be available only at the discretion of the coaches for students doing vigorous physical activity lasting an hour or more

Several individual/parent and school-based lifestyle interventions designed to improve dietary quality and/or access to more healthful alternatives have demonstrated a decrease in SSB consumption.

A diet and lifestyle change, multicomponent intervention targeting parents (the Hunter Illawarra Kids Challenge Using Parent Support study) improved the diets of their children by significantly decreasing total energy intake and SSB consumption. Overweight or obese children (5–9 years of age) and parents were randomly assigned to one of three groups, (1) a parent-centered family lifestyle and dietary modification program; (2) a child-centered physical activity skill development program; or (3) a combination of both programs. After 12 months, SSB consumption decreased among children participating in all of the programs. The mean SSB intake for all children significantly decreased from 5.0% of total energy intake to 2.9%.[78]

A family-based and culturally appropriate lifestyle, multicomponent intervention (the Memphis Girls Health Enrichment Multisite Study) effectively decreased SSB consumption among African American adolescent girls. The girls were randomly assigned to one of three groups, (1) an intervention group that provided weekly group sessions with the girls; (2) an intervention that included weekly group sessions with the girls' parents/caregivers; or (3) a comparison group. Content focused on knowledge and behavior change skills to promote healthy eating, including decreasing SSB consumption and increasing physical activity. The comparison group focused on self-esteem. The mean, baseline-adjusted, children's SSB intake at 12 weeks was significantly different by groups: 2.4 servings/day for those in the child-targeted group, 1.5 servings/day for those in the parent-targeted group, and 3.0 servings/day for those in the comparison group, suggesting that targeting parents/caregivers may provide the greatest impact.[79]

The effect of increasing availability of milk at home on body composition was examined among 98 children aged 8 to 10 years who regularly consumed SSBs in Chile. Children were randomly assigned to intervention and control groups. During the 16-week study, children in the intervention group were counseled to drink 3 servings of milk daily and to avoid consuming SSBs. Parents were asked to remove SSBs from the home. A supply of "flavored" milk (80 kcal/200 ml per serving) (of note, skim milk has 69 kcal/200 ml)[75] was delivered to the homes of enrolled children weekly. Among children in the intervention group, milk consumption increased significantly by 453 g/day (16 ounces/day) and SSB consumption decreased by 711 g/day (25 ounces/day). For the control group, milk consumption did not change, and SSB consumption increased by 72 g/day (2.5 ounces/day). Changes in percentage body fat, body weight, and BMI were not different between groups.[76]

In another randomized controlled trial, 103 U.S. adolescents aged 13 to 18 years who regularly consumed SSBs were assigned to intervention and control groups. Noncaloric beverages were delivered to the homes of adolescents in the intervention group for 25 weeks. The adolescents enrolled in the intervention group were discouraged from drinking SSBs through instructions given by phone or sent through the mail. In this study, daily consumption of SSBs decreased by 82% in the intervention group (-286 ml) while there was no change in the control group. Among adolescents with the highest BMIs (top one-third) at the beginning of the study, their increase in BMI by the end of the study was significantly less in the intervention compared to the control

groups. Among those with lowest BMIs (bottom one-third), the change in BMI in the intervention group was less than the change in the control group but was not significant.[26]

Choice, Control, and Change (C3) was a formative evaluation of a middle school curriculum designed to foster healthful eating and physical activity. The C3 was conducted in 19 science classes within 5 U.S. middle schools using a pretest-posttest evaluation design without a control group. The C3 curriculum consisted of 24 lessons taught by science teachers most school days over a period of about 7 to 8 weeks. The evaluation demonstrated that science-based education could improve the diet of students over the study period, including a reduction in SSB intake. The weekly consumption of soft drinks significantly decreased from 4.5 days per week at baseline to 4.2 days per week at follow-up. The consumption of non-carbonated SSBs decreased from 4.8 days per week to 4.1 days per week.[80]

D. Key Considerations

All Settings

- Some of the more healthful alternative beverage choices, such as flavored milk (according to the IOM School Nutrition Beverage Guidelines[48], this could be low-fat/non-fat milk with less than 22 g of total sugars per 8-ounce portion) and 100% juice, contain a substantial number of calories per serving. Therefore, it is important to monitor the quantity and frequency of consumption of these beverages in relationship to dietary quality and individual calorie needs as described in the Dietary Guidelines for Americans.[81] The IOM School Nutrition Beverage Guidelines recommended that milk contain less than 22 g of total sugars per 8-ounce portion.[48] The American Academy of Pediatrics advises that daily consumption of 100% juice be limited to one 4–6 ounce serving daily for young children and to two 6-ounce servings for older children and adolescents.[82]
- While artificially sweetened beverages (e.g., diet soft drinks) have a sweet taste and fewer calories, the evidence regarding the effectiveness of artificial sweeteners as a weight management strategy is inconsistent.[83]

Schools

- As outlined by the National Food Service Management Institute, efforts to promote more healthful beverages to students may be more effective when they:[84]
  - Identify and address the explicit rewards and barriers perceived by the target audience
  - Provide simple, strong, repetitive, consistent, and specific messages about the desired behavior
  - Promote benefits in terms of taste instead of nutrition
  - Be upbeat to engage and excite children and teenagers
  - Convince children and teens that selecting nutritious foods is easy to do
  - Present in a catchy and easily recalled format[84]

- Self-reports from schools working to improve the nutrient quality of beverages and foods sold to students indicate that increasing the availability of more healthful options does not reduce revenue from competitive foods. Of the 17 schools that reported income data for the report, *Making It Happen! School Nutrition Success*, 12 schools increased their revenue as a

result of the changes made to increase the availability of healthful beverages and foods, and four schools reported no change.[85]

E. Potential Action Steps

All Settings

- Collaborate with state, local, and city government officials and community leaders to develop or adopt healthy beverage policies for different settings and monitor to ensure effective implementation. For example, healthy beverage policies could be the adoption of the IOM School Nutrition Beverage Guidelines.[48]
- Work with relevant decision makers in each setting to develop a beverage purchasing policy to require beverages in container sizes that are age appropriate and suitable for each beverage type.
- Collaborate with relevant decision makers in each setting to develop and promote the adoption of healthy beverage policies for meetings, events, and other activities in their settings.
- Provide resources and training on how to select more healthful beverages for meetings and events to food service personnel and those who order catering for meetings and events.
- Provide information to the general public on the potential benefits of healthful alternatives to SSBs.

Communities

- Collaborate with state, local, and city government officials and food service industry to include posting of beverage calorie information as a component of point of purchase and menu labeling initiatives.

Schools

- Collaborate with school district officials and child care officials to monitor the availability of more healthful alternatives to SSB in schools and child care facilities.
- Provide education regarding the potential health effects of SSBs to teachers, parents, and other influential adults and emphasize their role as models for healthy beverage consumption.
- Incorporate nutrition/healthy beverage training into existing teacher training curricula.
- Provide training, technical assistance and support to guide the development and maintenance of a healthy beverage environment in schools and child care facilities.
- Assess whether nutrition education is a part of the core curriculum for students and whether beverage consumption is a part of this curriculum.

F. Program Examples

Community-based

Santa Clara County Healthy Food and Beverage Policy

The county of Santa Clara, California passed legislation that requires that 50% of the beverages sold in county vending machines meet specific nutrition guidelines. Beverages that meet the nutrition guidelines include:

- Water
- 100% fruit juices, with no additives
- Non-fat, 1%, and 2% non-flavored milk
- Plant-derived milk (i.e. soy, rice, and others)
- Artificially-sweetened, calorie-reduced beverages that do not exceed 50 calories per 12-ounce container
- Other non-caloric beverages

The county also set nutrition standards for county sponsored meals and events.[86]

School-based

Aptos Middle School, San Francisco Unified School District

A pilot study was conducted in Aptos Middle School, San Francisco's most racially diverse middle school, to assess the effectiveness of changes to the school vending and à la carte food policies. As part of the study, all soft drinks were removed from the vending machines located in the physical education (PE) department and replaced with bottled water. Following the change, students bought more bottles of water than they used to buy of soft drinks when soft drinks were available. Because the larger water bottles sold for a higher price, vending machine revenues increased in the PE department. In addition, soft drinks were also removed from the à la carte line in the cafeteria and replaced with water, milk, and 100% juice (no more than 12 ounces per serving) and healthier food options were added to the menu. Since the changes, à la carte revenues have remained similar to sales before the changes. Net revenues have increased, however, because costs for the cafeteria to procure the more healthful items are lower. The Aptos cafeteria ended the 2002–2003 year with a surplus of $6,000.[85]

Work site-based

South Dakota Worksite Sodabriety Healthy Challenge

In May of 2008 Healthy South Dakota conducted the "Sodabriety Healthy Challenge," one of a series of online challenges targeting worksites.[87] The purpose was to get South Dakotans to drink more water and fewer sweetened beverages. Over 1,000 registered participants completed beverage consumption records online. Participants were primarily women between the ages of 20 and 59, and over half were state government workers. Results from an online questionnaire sent to participants after the challenge showed that over the month of the Sodabriety Challenge:

- 88% increased water intake
- 74% decreased sugar-sweetened beverage intake
- 77% maintained increased water intake since challenge ended (for one month)
- 78% increased knowledge of health effects of sweetened beverages[87]

G. Resources

Communities

- **Healthy Beverage Community Action Kit**: Indian Health Service (2006). This kit provides action plans to promote increased consumption of more healthful beverages. http://www.ihs.gov/MedicalPrograms/Nutrition/

- **Texas! Bringing Healthy Back Presents: Growing Community**: Texas Department of State Health Services. This video series is a communications initiative and tool created to educate and inspire communities into action against obesity. Watch "Positioned for Change: Decreasing Sugar-Sweetened Beverages" at the following site. http://www.dshs.state.tx.us/obesity/growingcommunity/default.shtm
- **Dietary Sugars Intake and Cardiovascular Health**: The American Heart Association (AHA) Nutrition Committee of the Council on Nutrition, Physical Activity, and Metabolism and the Council on Epidemiology and Prevention. An AHA scientific statement provides the association's recommendations on specific levels and limits on the added sugar consumption. http://americanheart.mediaroom.com/index.php?s=43&item=800

Schools/Child care

- **Nutrition Standards for Foods in Schools: Leading the Way toward Healthier Youth**: Institute of Medicine (2007). This report was funded by the Centers for Disease Control and Prevention and developed by the IOM. It sets nutrition standards for K–12 schools focused on competitive foods. http://www.iom.edu/CMS/3788/30181/42502.aspx
- **Making it Happen! School Nutrition Success Stories**: U.S. Department of Agriculture and the Department of Health and Human Services' Centers for Disease Control and Prevention. This document is a collection of approaches implemented by over 30 schools and school districts to improve the nutrition environment in schools. http://www.fns.usda.gov/tn/Resources/makingithappen.html
- **Marketing Nutrition in the Middle Grades: Adolescent Food Habits and Marketing Strategies That Work**: The National Food Service Management Institute (2001). The school marketing report offers effective marketing strategies that apply to adolescents and middle grade students. The resource is intended for individuals and/or organizations who intend to implement a nutrition marketing campaign. www.cde.state.co.us/cdenutritran/download/pdf/Marketiiddlegrade.pdf
- **Nutrition and Physical Activity Self Assessment for Child Care (NAP SACC)**: This program aims to change the nutrition and physical activity environment of child care facilities with an assessment tool, implementation plan and policy information. The Website also provides information for parents, child care centers, health professionals, and policymakers. http://www.napsacc.org/

Worksites

- **Guidelines for Healthy Meetings**: New York Department of Health. The guidelines provide a list of suggestions for making work site meetings healthy. The guidelines give general information and specific recommendations for food options. http://www.health.state.ny.us/nysdoh/prevent/guidelines.htm
- **Meeting WellTM A Tool for Planning Healthy Meetings and Events**: The American Cancer Society. This tool is designed to help companies organize meetings and events with good health in mind. http://www.acsworkplacesolutions.com/meetingwell.asp

Strategy 4: Limit marketing of sugar-sweetened beverages and minimize marketing's impact on children

A. Definition

SSBs are extensively advertised and promoted to encourage their purchase. Efforts to reduce SSB consumption might include working to reduce the marketing of these beverages or to counter their marketing through media literacy training for children and other consumers.

B. Rationale

A report from the IOM concluded that beverage and food marketing influences children's preferences, their purchase requests, and consumption. The IOM also noted that beverage and food marketing is a likely contributor to the consumption of less healthful diets. In addition, consumption of a less healthful diet contributes to negative diet-related health outcomes.[77]

Consumer advertising and marketing is regulated almost exclusively at the federal level. However, there are no federal regulations regarding the advertising of SSBs. In 2006, the Federal Trade Commission and the Department of Health and Human Services issued a report urging the food marketing industry to take specific steps to change its marketing to children practices to help address childhood obesity.[88] Recently, the Council of the Better Business Bureau established guidelines on child-directed advertising of beverage and food products.[89] Since then, several beverage companies have agreed to voluntarily discontinue advertising SSBs directly to children under 12 and to instead promote products identified by the industry as those that contribute to more healthful dietary choices and healthy lifestyles.[89] However, no federal guidelines have been established for defining those more healthful lifestyle products or for monitoring compliance with these voluntary restrictions.

The nonalcoholic beverage industry is very competitive, so hundreds of new products are introduced each year. In 1999, this industry (excluding the dairy industry) spent more than $500 million on magazine and network television advertising.[90] Of food products, carbonated soft drinks have very high brand loyalty among teenagers. Because of this, many beverage and food marketers have increased their efforts to develop brand relationships with young consumers.[77]

The marketing of beverage and food products on the internet and through other digital media is increasing; however, television (TV) remains the leading media for targeting children and adolescents.[7] The amount of time spent watching TV has been associated with SSB intake.[91] Each 1-hour increment of TV viewing per day is associated with higher consumption of SSBs (0.06 servings/day), although this is unlikely nutritionally significant.[10]

The extent of soft drink advertising in schools is positively associated with existence of a pouring contract, subscription to Channel One (in-school television news network for teens nationwide), and receipt of incentives from soft drink bottlers based on sales. Soft drink advertising in schools is negatively associated with daily participation in the National School Lunch Program.[59] Another study reported that 19 (39%) of the 51 largest school districts in each

state and D.C had competitive food policies beyond state or federal requirements in 2004–2005. Of those 19 school districts, only 5 (26%) had policies that addressed marketing to students.[61]

C. Evidence of Effectiveness

There is limited research on evaluating the impact of minimizing advertising of SSBs on their consumption. A study which followed children (6th and 7th grades) for 19 months showed that higher rates of TV viewing are associated with higher total calorie intake among adolescents in the United States. This association was mediated by increasing intake of foods that were commonly advertised on TV, including SSBs. This study indicates that many adolescents seem to eat foods which were advertised on TV.[92]

The IOM conducted a systematic evidence review to assess the influence of marketing on the diet of children and adolescents and released a report. In their report, the IOM concluded that TV beverage and food advertising targeted to children and adolescents that promotes high-calorie and low-nutrient products influences children to favor and demand high-calorie and low-nutrient beverages and foods. Furthermore, the IOM concluded that there is strong evidence that television advertising influences the short-term consumption of children aged 2–11 years, but insufficient evidence for adolescents aged 12–18 years. Additionally, there is moderate evidence that television advertising influences the typical dietary intake of younger children aged 2–5 years and weak evidence for children aged 6–11 years.[77]

A mathematical simulation model was constructed to estimate possible impacts of decreasing exposure to TV food advertising on the prevalence of obesity among U.S. children aged 6–12 years. The model estimated that decreasing exposure of TV food advertising to zero would reduce the mean BMI by 0.38 kg/m^2. Furthermore, it would reduce the prevalence of obesity from 17.8% to 15.2% (95% uncertainty interval 14.8–15.6) for boys and from 15.9% to 13.5% (95% uncertainty interval 13.1–13.8) for girls.[93]

D. Key Considerations

- Advertising and marketing messages are disseminated through a vast array of media (television, magazines, cell phones, and internet) and in many different venues such as grocery stores, shopping malls, and movie theaters.

E. Potential Action Steps

All Settings

- Collaborate with state and local policymakers to eliminate advertising of SSBs aimed at children.
- Collaborate with state and local policymakers to develop or adopt policies that limit advertising of SSBs in public service venues.
- Collaborate with food manufacturers, retailers, restaurants and others to adopt guidelines for responsible food marketing to children.

Schools

- Collaborate with school district officials to incorporate media literacy training into school and child care curricula.
- Collaborate with school district officials and community advocates to redefine beverage "pouring contracts" to eliminate advertising of SSBs to students.

F. Program Examples

School-based

State of Maine's School Advertising Policy
State law in Maine prohibits brand-specific advertising of foods or beverages in school buildings or on school grounds except for beverages and food that meet established nutrition standards. Maine is the only state known to have enacted legislation to limit advertising in the schools.[94]

San Francisco Unified School District Commercial Free School Act
The Commercial Free School Act restricts advertising of commercial products within San Francisco Unified School District (SFUSD). It also prohibits SFUSD from entering into an exclusive contract with a soft drink or snack food company, commits to making healthy drinks and healthy snacks available to students, and eliminates the purchase or use of curriculum materials that feature brand names.[95]

G. Resources

- **Marketing Food to Children and Adolescents, A Review of Industry Expenditures, Activities, and Self-Regulation**: Federal Trade Commission (2008). This report provides an overview of food and beverage industry efforts to market to children and adolescents http://www.ftc.gov/os/2008/07/P064504foodmktingreport.pdf
- **Food Marketing to Children and Youth: Threat or Opportunity?**: Institute of Medicine (2005). This report provides recommendations for different segments of society to guide the development of effective marketing and advertising strategies that promote more healthful foods, beverages, and meal options to children and youth. http://iom.edu/CMS/3788/21939/31330.aspx
- **Guidelines for Responsible Food Marketing to Children**: The Center for Science for the Public Interest (CSPI) (2005). The guidelines provide the criteria for marketing food to children in a way that does not compromise their health. CSPI suggests that anyone who advertises to children (all industries) as well as parents and schools should utilize the tool. http://www.cspinet.org/marketingguidelines.pdf

Schools

- **Captive Kids: Selling Obesity at Schools**: California Project LEAN. This toolkit was developed as an action guide for those working to reduce the marketing of less healthful foods and beverages in schools. This guide provides information on policy development as well as, talking points, fact sheets and other resources to improve the school nutrition environment. http://www.californiaprojectlean.org/Assets/1019/files/CK2007.pdf

Strategy 5: Decrease the relative cost of more healthful beverage alternatives through differential pricing of sugar-sweetened beverages

A. Definition

This strategy increases the price of SSBs relative to other more healthful beverages through pricing adjustments, subsidies, or other differential pricing strategies.

B. Rationale

Price has been shown to be a key determinant of food choices.[96] There are number of strategies proposed to reduce SSB consumption, including pricing adjustments and subsides. Reducing prices of more healthful beverages or increasing prices of SSBs may be effective strategies for reducing consumption of SSBs. Pricing strategies could encourage positive behaviors and discourage negative behaviors. A combination of pricing strategies that include a mix of subsidies and price increase may be the most effective way to accomplish this.[97]

Pricing adjustments on SSBs have the potential to (1) discourage their consumption (2) equalize the costs of healthier and less healthful foods (3) encourage the production of healthier foods and (4) generate revenue that could be dedicated to obesity prevention.[97,98]

C. Evidence of Effectiveness

Based on the National Food Stamp Program Survey in the United States, it was estimated that a 10% increase in the price of soft drinks would lead to an 8% reduction in consumption among low-income households. A 10% reduction in milk price was estimated to increase the consumption of reduced-fat milk by 14%.[41]

The impact of price interventions on soft drink consumption may vary substantially depending on baseline consumption status. On the basis of a paper prepared for the Congress of the European Association of Agricultural Economists, individuals who drink greater amounts of SSBs are more sensitive to price increases and less likely to drink SSBs as prices increase in Norway. In this study, increasing the price of soft drinks by 11% was estimated to decrease consumption by nearly 7% in the lowest consumers and 17% among highest consumers. Increasing the price by 27% was associated with a drop in consumption of 17% in the lowest use group, 44% in the highest use group, with an overall 24% reduction in consumption across the population. This larger increase would reduce consumption of sugar-sweetened sodas by 2 liters per year for the moderate consumers and by 74 liters per year for those in the top 5% in level of consumption.[99]

Reducing prices of more healthful foods has been shown to increase their sales. For example, a study of restaurant purchases reported that a 25% price reduction for salads was associated with a doubling in sales.[100] Another study examined effects of pricing and promotion strategies on purchases of low-fat snacks from vending machines. Price reductions of 10%, 25%, and 50% on low-fat snacks were associated with significant increases in low-fat snack sales; percentages of low-fat snack sales increased by 9%, 39%, and 93%, respectively.[101]

D. Key Considerations

- Pricing adjustments and subsides, with the clear purpose of benefiting specific groups, such as children, are more likely to gain public support, but less likely to influence consumption or lead to meaningful decreases in BMI.[97]
- Pricing initiatives to affect consumption should consider all SSBs rather than limiting to soft drinks.
- Revenues from SSB pricing adjustments should be earmarked for support programs to prevent obesity.

E. Potential Action Steps

All Settings

- Build a coalition to advocate for and support the use of pricing adjustments to influence SSB consumption.
- Develop guidelines for voluntary implementation of price adjustments in vending machines and other venues to encourage healthy beverage consumption.

Communities

- Sponsor a meeting with key decision makers to discuss the options for beverage pricing adjustments.

F. Program Examples

School-based

Seattle Public Schools Policy on the Distribution and Sales of Competitive Foods

The Seattle Public Schools Policy on Competitive Foods requires that, for an equal-sized serving, all beverages, except milk, be priced higher than the price for bottled water. In addition, vendor contracts for sales of competitive foods shall not include incentives for increasing students' consumption of foods or drinks.[102]

Primary medical care-based

The University of Virginia Health System's "Snack Smart" Healthy Vending Program

The University of Virginia Health System's Healthy Vending Program uses colored stickers and a pricing incentive to encourage healthy beverage consumption. Red stickers are used to indicate beverages (and foods) that are the least healthy, including regular sodas, tea, and lemonade. A 5-cent surcharge is added to the cost of these items. Yellow stickers indicate beverages that can be consumed "once in a while". These include fruit drinks (<100% juice) and sports drinks. Green stickers are used to indicate the healthiest choices, including water, 100% juice, and diet beverages. Funds raised from red labeled items are used to support the University of Virginia's Children Fitness Clinic.

After the first year of implementation, a program demonstrated that overall sales increased by 8%. Sales of red labeled items decreased by 5%, yellow items increased by 31%, and green

labeled items increased by 1.5%. The 5-cent surcharge raised $6,700 for the University of Virginia's Children Fitness Clinic.[103]

G. Resources

- **Texas! Bringing Healthy Back Presents: Growing Community**: Texas Department of State Health Services. This video series is a communications initiative and tool created to educate and inspire communities into action against obesity. Watch "Positioned for Change: Decreasing Sugar-Sweetened Beverages" at the following site. http://www.dshs.state.tx.us/obesity/growingcommunity/default.shtm

Strategies Applicable to Medical Care Settings

Strategy 6: Include screening and counseling about sugar-sweetened beverage consumption as part of routine medical care

A. Definition

Screening and advice from primary care providers regarding SSB consumption practices and associated risks done as part of routine medical and dental care visits.

B. Rationale

Primary health care visits provide a unique opportunity for creating awareness and motivating change in regard to the consumption of SSBs, because primary care providers have direct contact with about 76% of U.S. children and youth under 18 years in 2004.[104] The U.S. Preventive Services Task Force recommended that clinicians screen children and adolescents aged 6–18 years for obesity. Clinicians can either offer or refer children and adolescents to comprehensive, intensive counseling and behavioral interventions to improve weight status.[105] Furthermore, the Expert Committee on the Assessment, Preventions, and Treatment of Child and Adolescent Overweight and Obesity recommended that a qualitative assessment of dietary patterns of all pediatric patients be conducted at each well child visit at a minimum for preventive guidance. According to the Committee, this assessment should include identifying excessive consumption of sweetened beverages.[106]

The National Committee for Quality Assurance has added two new measures related to obesity to the 2009 Healthcare Effectiveness and Data Information Set (HEDIS). The HEDIS is the most commonly used quality performance measurement set in medical care. The new measures will assess physician performance for BMI measurements among adults and children and track physician counseling for nutrition and physical activity among children.[107]

SSB consumption also has been linked to increased risk of dental caries[37] and dental care providers, including general and pediatric dentists, can be important primary care partners in the effort to reduce SSB consumption. The American Academy of Pediatric Dentistry recommends that all children should see dental professionals in their first year of life and at least every 6 months thereafter, depending on their risk status.[108] Furthermore, the American Academy of Pediatric Dentistry encourages (1) dentists and medical care providers to educate their patients to increase public awareness of the negative effects of frequent SSB consumption (carbonated and noncarbonated) on infant, child, and adolescent nutrition, oral health, and general health including obesity and (2) school officials and parent groups to think about the importance of maintaining healthy choices in school vending machines and promote beverages with high nutritional value; bottled water and other more healthful alternatives should be available in vending machines instead of soft drinks.[109]

C. Evidence of Effectiveness

The Keep ME Healthy (or the 5-2-1-0) Program was developed by the Maine Youth Overweight Collaborative (MYOC) to support obesity prevention efforts in the clinical setting (see *Program*

Examples below). The MYOC evaluated use of this framework among primary care practices. The study results demonstrated that the percentage of parents/caregivers reporting that a doctor, nurse, or other office staff spoke with them about sugar-sweetened drinks increased by 30% to 50% among those using the framework. About 90% of parents/caregivers of obese patients reported that someone in the primary care practice had talked with them about sugar-sweetened drinks and 40% reported that a beverage goal was set to change behavior.[110]

D. Key Considerations

- In general, time available for physicians to do nutrition screening and counseling is limited.[111]
- Availability of insurance reimbursement for preventive nutrition counseling may be limited.[112]

E. Potential Action Steps

- Support the implementation of the recommendation from the Expert Committee on Assessment, Preventions, and Treatment of Child and Adolescent Overweight to ensure screening and counseling for high SSB consumption as part of all well child visits.
- Develop and promote the use of decision prompts/tools to facilitate assessment and guidance in regard to SSB consumption by primary care providers.
- Support efforts to ensure reimbursement for practitioner time spent providing nutrition counseling.

F. Program Examples

Keep ME Healthy

The *Maine Youth Overweight Collaborative* (MYOC), together with the Maine chapter of the American Academy of Pediatrics, developed a framework based on four key messages to guide obesity prevention in the clinical setting. This framework for their "Keep ME Healthy" Program, also referred to as the "5-2-1-0" Program, consists of encouraging five (5) or more servings of fruits and vegetables on most days; limiting screen time to two (2) hours or less daily; participating in at least one (1) hour or more of physical activity daily, and; avoiding (0) sugar-sweetened beverages, limiting fruit juice to one-half cup or less per day and encouraging water and 3–4 servings of non-fat milk daily. An evaluation of the program demonstrated that patients attending clinics that adopted the 5-2-1-0 framework were more likely to speak with their medical care providers about their beverage consumption practices and these patients were more likely to set goals related to their SSB consumption.[110]

As a result of the success of the Keep ME Healthy Program, the American Academy of Pediatrics has developed a new Pediatric Obesity and Nutrition Resource Package that includes a flip chart adapted from the Keep ME Healthy Program that can be used by medical care providers as a decision-support tool. In addition, the Nemours Health and Prevention Services has adapted the Keep ME Healthy (5-2-1-0) framework to formulate their "5-2-1-Almost None" strategy to promote their healthy lifestyle theme.[113]

Alliance for a Healthier Generation Healthcare Initiative

The Alliance Healthcare Initiative is a collaborative effort with national medical associations, leading insurers and employers to offer comprehensive health benefits to children and families for the prevention, assessment, and treatment of childhood obesity. Through this program, doctors are reimbursed for bringing children back for follow-up visits and for working with them on the adoption of healthy behaviors. Registered dietitians are also reimbursed for providing in depth nutrition counseling over multiple visits to those children who are referred by their doctors. By working together, doctors and registered dietitians help children and their families adopt more healthful eating habits to improve their health and weight. Participating companies have access to materials and resources developed by the Alliance to inform parents about childhood obesity prevention and treatment.[114] To date, the effectiveness of this initiative has not been evaluated.

G. Resources

- **Barlow SE and the Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary Report.** *Pediatrics*. 2007;120 (Suppl 4): S164-192. This report advises pediatric physicians on assessing dietary behaviors including sugar-sweetened beverage consumption and promoting healthy dietary behaviors. http://pediatrics.aappublications.org/cgi/reprint/120/Supplement_4/S164
- **Pediatric Obesity and Nutrition Resource Package**: American Academy of Pediatrics. This package includes pediatric obesity prevention, intervention, and treatment strategies for primary care, the pediatric obesity clinical decision support chart, and parent's guide to childhood obesity. https://www.nfaap.org/netforum/eweb/DynamicPage.aspx?webcode=aapbks_productdetail&key=72d080ff-2b54-48c6-afba-8609a35109f5
- **The Alliance for a Healthier Generation Healthcare Initiative**: This initiative was developed to address childhood obesity by focusing on prevention and assessment by primary caregivers. http://www.healthiergeneration.org/healthcareprofessionals.aspx?id=294

Strategy 7: Expand the knowledge and skills of medical care providers to conduct nutrition screening and counseling regarding sugar-sweetened beverage consumption

A. Definition

Increase the knowledge and skills of medical care providers in offering or referring patients to comprehensive, intensive counseling and behavioral interventions to improve weight status and their SSB consumption practices through core training and continuing education.

B. Rationale

Evidence suggests that clinicians have a wide range of training and experience in nutrition counseling. However, some medical care practitioners report low confidence in their ability to provide nutrition and lifestyle counseling.[115,116] A study demonstrated that one of the most common areas of self-perceived low proficiency among U.S. pediatricians, pediatric nurse, and registered dietitians was counseling-related skills needed to manage childhood obesity effectively.[115]

Although there is increased concern on childhood obesity and diet-related diseases, nutrition education continues to be lacking in medical training programs. A study conducted in the United States reported that among 61 internal medicine interns, 62% reported receiving nutrition education in undergraduate, graduate, or medical schools. About 31% of medical schools offered a nutrition elective, but only 3% of interns took the nutrition course. Furthermore, when their knowledge was tested in the study regarding nutrition assessment, endocrine disease, cardiovascular disease, gastrointestinal disease, renal disease, and pulmonary disease, the overall correct score was 66%. When test scores were broken down by topic areas, mean nutrition knowledge at 62% was below the average score. About 77% of interns agreed that nutrition assessment should be incorporated into routine primary care visits, and almost all interns (94%) agreed that it is their job to provide nutrition counseling. However, 86% agreed that most physicians are not trained to provide nutrition counseling to their patients.[116]

There is need to increase physician counseling about diet and physical activity. One option is for medical schools to provide nutrition education to improve counseling skills of medical students as a part of their curricula.[117] This information should include the childhood obesity Expert Committee recommendation to limit consumption of SSBs as one of seven target behaviors for which consistent evidence shows an association between the recommended behavior and either obesity risk or energy balance.[106]

The American Heart Association, in their guide for practitioners regarding dietary recommendations for children and adolescents, highlights the importance of reducing the intake of SSBs to minimize cardiovascular disease risks.[118] In addition, the American Academy of Pediatrics Committee on School Health has issued a policy statement intended to inform pediatricians and other health care providers about nutritional concerns regarding soft drink consumption in schools.[119]

In addition to nutrition knowledge, medical care providers need to build skills in effective counseling techniques. Motivational interviewing is a commonly used counseling technique. It is a directive, client-centered counseling style that facilitates behavior change.[120] It has been used by public health professionals, dietitians, and other health professionals to address various chronic disease behaviors including childhood obesity.[121]

C. Evidence of Effectiveness

A study was conducted to evaluate an impact of an innovative preventive medicine and nutrition course on medical students' confidence regarding diet and exercise counseling in the Harvard Medical School. A 28-hour preventive medicine and nutrition course was given to the second-year medical school students. Survey data were collected before and after the course from 134 students and 118 students, respectively. This study reported that an innovative preventive medicine and nutrition course significantly improved medical students' confidence in diet and exercise counseling. This improvement on nutritional counseling for patients among medical students may influence their practice patterns.[117]

An intervention study was conducted to examine the impact of nutrition education provided by a physician nutrition specialist on physicians' nutrition knowledge, nutritional counseling practice, and patients' reports of nutritional counseling. For 6 months, a physician nutrition specialist provided family physicians (7 faculty members and 9 residents) with individualized recommendations for nutrition-related issues that should be discussed with their patients. These recommendations were given in detachable notes placed in the charts of patients or by discussion with the physicians. Additionally, the physician nutrition specialist gave a lecture on nutrition-related disease and recommendations for healthy diets to family physicians during family practice inpatient rounds. Nutrition knowledge of physicians and patients were collected before and after intervention. This study reported that the nutrition intervention significantly increased nutrition knowledge scores from 73% to 76% for physicians and from 46% to 50% for their patients. Furthermore, the frequency that physicians asked their patients about nutrition and diet increased significantly from 26% to 40%.[122,123]

The Maine Youth Overweight Collaborative (MYOC) intervention was used as the prevention program to identify whether a pediatric primary care-based intervention can improve physician practice and patient and family behaviors for childhood obesity. The intervention sites participating MYOC received packages of tools for clinical decision support and counseling and self-management support for families and patients. During 18 months of MYOC implementation, significant changes occurred in clinical practice to identify, prevent, and treat childhood obesity and family management of risk behaviors for childhood obesity. Clinicians in the intervention sites increased the frequency in assessment of BMI and BMI percentiles for age and sex, use of the 5-2-1-0 behavior screening tool, and weight classification. Furthermore, clinicians in the intervention sites reported improvements in knowledge, attitudes, self-efficacy, and practice.[124]

D. Key Considerations

- There are many competing interests for material to be covered in the core training curriculum and in continuing education for medical care providers.

E. Potential Action Steps

- Collaborate with professional national and state health practitioner associations to provide continuing education for primary care providers to enhance their dietary assessment and counseling skills regarding SSB consumption.
- Collaborate with schools of medicine, nursing, dentistry, and other allied health professions to incorporate training on nutrition and effective counseling techniques as a part of core curricula.

F. Program Examples

Sugar-sweetened beverage training for dental students

An intervention study was conducted to increase knowledge related to oral and systemic health effects of soda consumption among dental students in the United States. An educational brochure was distributed to the first-year dental students during a lecture. This lecture focused on the effects of soda consumption on oral and systemic health. After a combination of written (brochure) and oral (lecture) education, the first-year dental students significantly improved both their knowledge and behavioral intent related to soda consumption. This accumulated knowledge among dental students can be incorporated into their dental caries risk assessment conducted with their patients.[125]

G. Resources

- **Educating Physicians on Controversies & Challenges in Health, Motivating Patients to Change Behavior**: The American Medical Association. Continuing medical education (CME) course on the use of motivational interviewing is available. http://www.ama-assn.org/ama/pub/physician-resources/public-health/general-resources-health-care-professionals/educating-physicians-controversies-challenges-health.shtml
- **CounterDetails: Pediatric Obesity Management, July 2008**: Pennsylvania Department of Health and Pennsylvania Medical Society. This newsletter issue is based on the Expert Committee Report and offers continuing education credits through the PMS website. CMEs available until Dec. 31, 2010. Pennsylvania Department of Health: http://www.dsf.health.state.pa.us/health/cwp/browse.asp?a=174&bc=0&c=38832 Pennsylvania Medical Society: http://www.pamedsoc.org/MainMenuCategories/CME/CME-Activities/CounterDetails/Pediatricobesity.aspx
- **5210 Pediatric Obesity Clinical Decision Support Chart:** Adapted from the keep ME healthy flip chart developed by the Maine Center for Public Health and the Maine Chapter of the American Academy of Pediatrics. www.aap.org/bookstore

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